

Report Information  
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**Electrical transport properties of CoSi/sub 2/ and NiSi/sub 2/ thin films.****Dialog eLinks**Full text options [USPTO Full Text Retrieval Options](#)**Accession number & update**

0002267245 20070101.

**Source**

Applied Physics Letters, {Appl-Phys-Lett-USA}, 1 May 1984, vol. 44, no. 9, p. 913-15, 11 refs, CODEN: APPLAB, ISSN: 0003-6951, USA.

**Author(s)**

Hensel-J-C, Tung-R-T, Poate-J-M-, Unterwald-F-C.

**Author affiliation**

Hensel, J.C., Tung, R.T., Poate, J.M., Unterwald, F.C., AT&amp;T Bell Labs., Murray Hill, NJ, USA.

**Abstract**

Transport studies have been performed on thin films of CoSi/sub 2/ and NiSi/sub 2/ in the temperature range 1-300K. The conductivities are metallic with essentially the same temperature dependence; however, the residual resistivities are markedly different even though the two silicides are structurally similar (the room-temperature resistivity of NiSi/sub 2/ being at least twice that of CoSi/sub 2/ of 15 m $\Omega$ cm). The difference is attributed to intrinsic defects in NiSi/sub 2/. This defect has been simulated by ion bombardment of the film where it is also shown that Matthiessen's rule is obeyed over a remarkable range of bombardment doses.

**Language**

English.

**Publication year**

1984.

**Copyright statement**

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**Low-temperature diffusion of silicon atoms in the nickel-nickel silicide-silicon system.****Dialog eLinks**Full text options [USPTO Full Text Retrieval Options](#)**Accession number & update**

0002643349 20070101.

**Source**

Soviet Physics Journal, {Sov-Phys-J-USA}, March 1985, vol. 28, no. 3, p. 242-5, CODEN: SOPJAO, ISSN: 0038-5697, USA. Translation from: Izvestiya Vysshikh Uchebnykh Zavedenii Fizika, {Izv-Vyssh-Uchebn-Zaved-Fiz-USSR}, March 1985, vol. 28, no. 3, p. 78-83, CODEN: IUUFAC, ISSN: 0021-3411. Country of publication: USSR.

**Author(s)**

Rodionov-A-I, Uskov-V-A.

**Author affiliation**

Rodionov, A.I., Uskov, V.A., A.A. Zhdanov Gor'kii Polytech. Inst., USSR.

**Abstract**

The diffusion of Si atoms from a silicon substrate through a layer of nickel monosilicide into a Ni film is investigated in the temperature interval 470-670K by the method of radioactive isotopes. The distribution profile of Si in NiSi and Ni is derived. The GB-diffusion parameters of Si in NiSi are determined. It is shown that when T>570K there is an increase in the thickness of the initial NiSi layer, and a kink appears on the 1n D=f(1/T) curve. The associated change in the activation energy of diffusion from 0.43 (470-570K) to 0.72 eV (570-670K) is explained by the formation of Ni-Si and Si-O type

complexes. The diffusion of silicon atoms accompanied by complex- formation processes determines the evolution of the resistivity of the **Ni-NiSi-Si** contact.

**Language**

English.

**Publication year**

1985.

**Copyright statement**

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## The growth processes of thin film silicides in Si/Ni planar systems.

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**Accession number & update**

0002546568 20070101.

**Conference information**

Sixth International Conference on 'Thin Films', Stockholm, Sweden,  
13-17 Aug. 1984.

**Source**

Thin Solid Films, {Thin-Solid-Films-Switzerland}, 15 March 1985, vol. 125, no. 1-2, p. 71-8, 11 refs,  
CODEN: THSFAP, ISSN: 0040-6090, Switzerland.

**Author(s)**

Majni-G, Costato-M, Panini-F.

**Author affiliation**

Majni, G., Costato, M., Panini, F., Dept. of Phys., Modena Univ., Italy.

**Abstract**

All the compounds predicted from the **Si-Ni** phase diagram were observed by depositing thin layers of **nickel** onto silicon in known quantities and ratios to each other using an unreactive substrate such as **SiO/sub 2/**. After deposition, the samples were annealed in the **temperature** range 200-750°C and analysed using 2 MeV /sup 4/He/sup positive Rutherford backscattering spectrometry and X-ray diffraction techniques. **Ni/sub 2/Si** is the first phase formed at a low **temperature** (about 250°C). Under silicon-rich conditions the system develops in a reproducible manner, subsequently giving rise, when all the **nickel** was reacted, to the formation of **NiSi** and of **NiSi/sub 2/** by reaction at 750°C of the **NiSi** with silicon. The kinetic diffusion approach accounts for the formation and sequence of **Ni/sub 2/Si** and **NiSi**. The phase **Ni/sub 5/Si/sub 2/** forms between **Ni/sub 2/Si** and **nickel** under **nickel**-rich conditions. The phases **Ni/sub 3/Si/sub 2/** and **Ni/sub 3/Si** were observed at 400°C and 450°C respectively.

**Language**

English.

**Publication year**

1985.

**Copyright statement**

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## Formation of Ni silicide from Ni(Au) films on (111)Si.

**Dialog eLinks**

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**Accession number & update**

0005277567 20070101.

**Source**

Journal of Applied Physics, (J–Appl–Phys–USA), 15 April 1996, vol. 79, no. 8, p. 4078–86, 41 refs, CODEN: JAPIAU, ISSN: 0021–8979. Publisher: AIP, USA.

**Author(s)**

Mangelinck–D, Gas–P, Grob–A, Pichaud–B, Thomas–O.

**Author affiliation**

Mangelinck, D., Fac. des Sci. de Saint Jerome, CNRS, Marseille, France.

**Abstract**

The solid state reaction between a **Ni** (7 at. 96 Au) **film** and a Si substrate at temperatures ranging from 250 to 800°C is examined by scanning electron microscopy, X–ray diffraction, and Rutherford backscattering spectrometry. Compared to the usual features for thin **film** reaction of **Ni** with Si, we observed the following. (i) The simultaneous growth of **Ni**/sub 2/Si and **NiSi**, and the growth of **NiSi** at the expense of both **Ni**/sub 2/Si and **Ni**. This is related to Au accumulation in the metal **layer**. (ii) Au precipitation at 300°C followed by the dissolution of the clusters thus created above the Au–Si eutectic **temperature** (370°C). (iii) A decrease of the **temperature** of formation of **NiSi**/sub 2/ and the appearance of thickness oscillations that are characteristic of nucleation. These different effects are interpreted by taking into account the metallurgy of the system: segregation of Au in the **Ni film**, Au solubility in the different silicides, change in surface and interface energies, and chemical interactions with Si.

**Language**

English.

**Publication year**

1996.

**Copyright statement**

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## In-situ investigation of the formation of nickel silicides during interaction of single-crystalline and amorphous silicon with nickel.

**Dialog eLinks**

Full text options [DSPTO Full Text Retrieval Options](#)

**Accession number & update**

0006937599 20070101.

**Source**

Journal of Alloys and Compounds, (J–Alloys–Compd–Switzerland), 26 April 2001, vol. 319, p. 187–95, 23 refs, CODEN: JALCEU, ISSN: 0925–8388. Publisher: Elsevier, Switzerland.

**Author(s)**

Bokhonov–B, Korchagin–M.

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Bokhonov, B., Korchagin, M., Inst. of Solid State Chem., Acad. of Sci., Novosibirsk, Russia.

**Abstract**

In situ investigations showed that the sequence of phase formation during interaction of **nickel** particles with single crystalline (100) silicon and amorphous silicon corresponds to the following sequence of stages during the annealing of **thin–film** systems: (a) within a **temperature** range up to 500°C, the first and prevailing phase formed is **Ni**/sub 2/Si; and (b) annealing at temperatures above 600°C is accompanied by the formation and epitaxial growth of the **NiSi**/sub 2/ phase. The growth of the **nickel** disilicide crystalline phase is accompanied by the formation of dislocations both in the **nickel** disilicide phase and in the silicon phase. The interaction of the amorphous silicon **film** with **nickel** particles at temperatures above 600°C leads to the crystallization of several silicide phases: **NiSi** /sub 2/, **NiSi**, **Ni**/sub 3/Si/sub 2/. The formation of silicide phases due to the interaction of **nickel** particles with silicon during annealing did not confirm the formation of an intermediate amorphous silicide that was observed earlier in **thin–film nickel–silicon** systems. Irradiation with a beam of accelerated electrons in a

microscope leads to an increase of the rate of silicide phase formation and to a decrease of the **temperature** at which the **nickel** disilicide phase is formed epitaxially, at least to 400°C. In our opinion, the observed effect can be due to the formation of defects in the structure of single crystalline silicon.

**Language**

English.

**Publication year**

2001.

**Copyright statement**

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## Search Strategy

No.	Database	Search term	Info added since	Results
1	INZZ	(nickel ADJ monosilicide OR NiSi) AND (layer OR film) AND ratio AND temperature AND amorphous	unrestricted	5
2	INZZ	(nickel ADJ monosilicide OR NiSi) AND (layer OR film) AND temperature	unrestricted	575
3	INZZ	2 AND (Nickel OR Ni)	unrestricted	554
4	INZZ	3 AND (Si OR silicon)	unrestricted	531
5	INZZ	4 AND (anneal* OR (thermal OR heat) ADJ treatment)	unrestricted	28
6	INZZ	3 AND amorphous	unrestricted	116
7	INZZ	4 AND amorphous	unrestricted	116

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